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**NAVAL WAR COLLEGE
Newport, RI**

**WHITHER SPACE WEAPONS: A CAPABILITY IN NEED OF AN
ADVOCATE**

By

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Lieutenant Colonel, USAF**

A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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17 May 2005

Abstract

Space weaponization has been a much debated topic over the past decade. The debate has included political and technical discussions on whether, with what, and for what purpose to weaponize space. Little has been written about space weaponization from the operational commander's perspective. Absent commentary from the combatant commanders, it is difficult to determine from a theater strategic perspective how space weapons might be employed to preserve peace and win wars. This paper highlights the problems inherent in the current technological, political and service parochial discussion regarding space weapons and advocates that combatant commanders should be the primary voice and the determining factor on space weaponization.

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Introduction

A thorough review of space warfare and space weaponization literature reveals that technologist or political/social scientists are the principal authors. These documents are well-researched and provide a broad background of information on a complex topic. What the literature is missing, however, is a discussion of what space-based weapons in general could accomplish for the combatant commander. Most papers try to define schools of thought on why space should or should not be weaponized. A large volume of papers discuss the attributes of particular technologies and why they should or should not be developed into space-based capabilities. The problem with these schools of thought or technology papers is they tend to neglect the advantages that space provides to combatant commanders.

The purpose of this paper is not to advocate space weaponization. Rather it is to advocate for a proper advocate. Technologists unquestionably have the ability to develop a better mouse trap. Policy gurus argue eloquently for or against a given proposal based on the security environment. The individual services understand warfare, but they tend to translate requirements into service specific capabilities. What space weaponization needs is an advocate who can speak to what he would expect a space-based weapon to do for him in light of his mission requirements. We do not need more papers about weapons looking for a mission. We need position papers and integrated priority lists defining missions in need of a weapon. If that mission can be force multiplied with the advantages the space environment can provide, then we may have a justifiable space capability that can be developed to meet war fighting needs in both peace and war.

The thesis of this paper is that technologist peddling their wares, political strategies advocating arms control regimes (for and against), and the services either overselling or

ignoring space capabilities are the wrong communities to advocate space weaponization (or space sanctuary). Their positions, while useful from an academic or service specific point of view, do not focus on the combatant command prospects for military mission accomplishment. Those responsible for military mission accomplishment, the combatant commanders, should be the primary advocate for, or at least have the last word on space weaponization.

This paper will review space weaponization from a business model perspective and prospects for space advocacy within that model. It will assess what capabilities and limitations space systems can offer from a power projection perspective. It will discuss the current state of policy and the nature of space warfare and attempt to identify why, from an historical military innovation perspective, combatant commanders may be best positioned to advocate the development of space weapons if they should be developed at all.

In addition, this paper will avoid taking a position on space weaponization per se and thus cannot be characterized within one of the many schools of thought proposed by Professor Karl Mueller's typology.¹ However, it does assume that from a warfighting perspective space capabilities should be pursued if one believes either that because space weaponization is inevitable, the United States should be first (the "space racer" school) and/or that the military utility of space is so great that the benefits to the United States of weaponization either outweighs the cost or should be included in the trade space of alternatives for power projection (the "space controller" school). This paper does not assume

¹ Karl P. Mueller, "Is the Weaponization of Space Inevitable?" paper presented at International Studies Association, New Orleans, LA, March 27, 2002. Professor Mueller's typology includes a total of six schools of thought.

that space, as the ultimate high ground, ought to be weaponized at any cost (the “space hegemonist” school).²

Space Weapons as a Disruptive Technology

In many ways the introduction of space weapons into the United States arsenal parallels the introduction of a disruptive technology into an existing business line. People are generally resistant to change; therefore, it would follow that when the change presents a fundamentally new way of thinking and has the potential to rock the very core of an organizations existence, people and organizations may be particularly resistant. “Disruptive technologies introduce a very different package of attributes from the one mainstream customers historically value, and they often perform far worse along one or two dimensions that are particularly important to those customers.”³ Therefore, if the technology is flawed, those resistant to change would focus on those flaws to dismiss its development. I will address this point later in the section of space capabilities and limitations.

According to Carl Builder, the Air Force is the most technologically focused branch of the military.⁴ I believe this is a fair characterization; however, other branches of the military are becoming more technologically savvy due to a combination manpower reductions and the increasing complexity of warfare that require the common soldier to perform more and varied tasks simultaneously. Despite this focus on technology, the Air Force has been known to resist technological innovations. “The Air Force resisted the ICBM [Intercontinental Ballistic Missile] because it was ‘committed to manned aircraft ... in

² Bruce M. DeBlois, and others, “Space Weapons: Crossing the U.S. Rubicon, *International Security*, Vol. 29, No. 2, (Cambridge, MA: The MIT Press, Fall 2004) 54-55.

³ Joseph L. Bowers and Clayton M. Christensen, “Disruptive Technologies: Catching the Wave,” *Harvard Business Review on Managing Uncertainty*, (Boston, MA: Harvard Business Review Paperback, 1999), 154.

⁴ Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis*, (Baltimore, MD: Johns Hopkins University Press, 1989), 19.

particular the manned bomber.”⁵ Bureaucracies are a bastion for entrenchment and an impediment to progress ... they are also a model of consistency (both good and bad). However, “the bureaucratic imperative to preserve existing missions and way of operating tends to crush the impulse to make technological innovations.”⁶ As a result, the services have limited incentive to change their fundamental concepts of warfare.

According to Jacques Gansler, former Deputy Assistant Secretary of Defense (Material Acquisition) and Senior Vice President of TASC, an advanced technology think tank that does work for both the Department of Defense and the Central Intelligence Agency, “The problem in these breakthrough areas is in creating the initial market. In fact, this can be a bigger problem than creating the technology itself.”⁷ The “fundamental reason” businesses reject potentially beneficial breakthrough technologies is because “They stay close to their customers.”⁸

Just like in business, the policy, technology, and service communities within the government will listen to their customer ... in this case the combatant commander. This dialog needs to be more than technologist peddling their wares and combatant commanders saying “I’d like some of that.” Unfortunately, combatant commanders are often too busy focusing on the current crisis to pontificate about what future technologies might contribute to a fundamentally different way to deter and win wars in their theater. However, if fundamentally different disruptive technologies such as space weapons are to be introduced into the American way of war, some deep thought about future warfare will have to occur at the combatant commander level.

⁵ Stephen Peter Rosen, *Winning the Next War*, (Ithaca, NY: Cornell University Press, 1991), 231.

⁶ *Ibid*, 231.

⁷ Jacques S. Gansler, *Defense Conversion*, (Cambridge, MA: The MIT Press, 1998), 193.

⁸ *Ibid*, 149.

Space Capabilities and Limitations

Over the past decade much debate has occurred and much has been written advocating or arguing for or against the development of space weapons. A recent study by RAND Corporation identifies four arguments that might justify the development of space weapons. The first three justifications relate to some threat or some cooperative effort with an allied nation. I would characterize them as “wait and see” justification. I think that these arguments, while valid, may not provide capability on the most important basis: a need to meet existing and/or emerging regional threat that directly respond to warfighting requirements. The fourth justification: “unilaterally undertaking the acquisition of space weapons ... to demonstrate global leadership, to protect U.S. and allied economic investments, or to improve the efficiency and effectiveness of military capability,”⁹ is the only one of the four that captures the proper rationale for U.S. development of any new weapons systems. Space-based weapons like any new weapon should be based on warfighting requirements or parameters articulated by combatant commanders in their integrated priority lists. These requirements should be based on mission capabilities needed rather than advocacy for a particular system in the acquisition cycle. Mission requirements for which space systems have the requisite attributes should be migrated to space system research and development and/or acquisition.

Fundamentally, space systems have certain attributes. “For military purposes, space offers an unmatched vantage point for observation of potentially hostile activity anywhere in the world.”¹⁰ The vantage point is in a location that is politically neutral and relatively unlimited in potential for power projection as well. As such, “space also offers a deployment

⁹ Bob Preston, Dana J. Johnson, Sean J. A. Edwards, Michael Miller, Calvin Shipbaugh. *Space Weapons, Earth Wars*, (Santa Monica, CA: RAND Corporation, 2002), xxii.

¹⁰ Jim Oberg, *Space Power Theory*, (Washington, D.C.: Government Printing Office, 1999), 14.

area for stationing weapons for use both against in-space targets and against surface targets.”¹¹ In addition, space systems have an inherent presence that can be exploited in military terms through near instantaneous response (depending on the number and orbital location of the weapon) during periods of peace and conflict. Once on orbit, satellites can operate for extended periods and cover the entire surface of the earth (though coverage may not be continuous, the duration of coverage can be preprogrammed prior to launch). As a result, unlike other forces, space forces can provide undeniable access and freedom of action (see vulnerabilities) during periods of both peace and conflict. Like the Navy, space offers direct access to targets from neutral territory and like airpower it exploits the vertical dimension ... space offers the best of what sea and air power offer in a single package.

Space does have several limitations, however. Space systems are designed and built to be lightweight. As a result their supporting structures are vulnerable to kinetic and directed energy attack. In addition, orbitology is a highly predictable phenomenon. Once a space system is launched, it can be tracked and its location can be determined at any given time. This limitation assumes that some method of disguising either the mission or location, if possible, has not been employed. Given the fragility and predictability of space systems, it would seem to me that a lucrative research and technology area would be investments that seek to disguise the signatures and missions of space systems. Finally, cost drivers are a major factor in times of limited budgets and in times of crises for which space-based weapons appear to have limited utility – third world and/or non-state adversaries. However, we cannot focus solely on this lowest common denominator foe. We need to evaluate potential space weapons from the perspective of what it may offer the warfighter: what can be done to overcome its limitations and what existing terrestrial might be replaced by space

¹¹ Ibid, 15.

systems as a cost trade-off? Therefore, despite that space systems are costly to build and maintain, if existing capabilities can be reduced or removed, there may be room for these systems in the United States military arsenal within the programmed budget.

Current Space Policy

A common misconception among warfighters is that space-based weapons violate a number of treaties to which the United States is a signatory. This is simply not the case. Granted, “some space-based weapons are explicitly prohibited by treaty: weapons of mass destruction”¹² and until recently some components of ballistic missile defense. However, with the “U.S. abrogation of the 1972 Antiballistic Missile (ABM) treaty under President George W. Bush in 2002,”¹³ the United States is relatively free to pursue space-based weapons platforms to include antiballistic missile systems.

Regarding space policy, since 1996 when the Clinton administration produced what was arguably the first comprehensive national space policy, the United States has included force application as part of its space force potential. As late as 1998, Air Force Space Command’s discussion of force application, at least in open literature, mentioned only terrestrial based ICBM’s under force application.¹⁴ However, more recently “DoD directive 3100.10 defined force application more generally that it did ballistic missiles, as: Combat operations in, through, and from space to influence the course and outcome of conflict.”¹⁵ This more general definition captures the essence of what space-based weapons might offer in the future: the capability to project combat power from space to the earth to promote or restore peace.

¹² Preston, 3.

¹³ DeBlois, 53.

¹⁴ Preston, 17.

¹⁵ Ibid, 17. As quoted from the 1999 DoD space policy, p. 9.

One area that may need review is how Air Force stewardship of space has affected the development of space capabilities. Space systems began as a supporting element of warfare. No power projection capability has yet been deployed and those capabilities that have been in development, such as the space-base laser and the strategic defense initiative, have been placed on the backburner or canceled. This is not necessarily the fault of the Department of the Air Force, but lacking a strong advocate, space systems, especially those that represent a fundamentally new mission capability and/or interfere with the status quo within the defense establishment will continue to suffer from a lack of support.

Nature of Space Warfare

Air and space systems operate in fundamentally different ways. Both “exploit the vertical dimension.” This argument has been made by the Air Force to justify its position as the space steward. However, the operations and the protection of space assets have greater similarity to the maritime environment: they operate in neutral territory and their protection is similar to the protection of commercial shipping from both an operation (frequency protection) and freedom of movement (orbital location) aspect. Protecting space system from mechanical and electronic interference is similar to the Navy’s mission of protecting sea lanes.

Upon reading Julian Corbett’s noted work, *Some Principles of Maritime Strategy*, the parallels between the nature of sea power and space power are evident. According to Corbett, outside territorial waters the sea is not susceptible to ownership.¹⁶ The same can be said about space beyond altitudes that permit controlled flight. Space, like the open sea, is neutral territory. Space is also a medium that requires defense and protection of chokepoints (orbits) and lines of communication (electronic uplinks and downlinks). It is an area of

¹⁶ Julian S. Corbett, *Some Principles of Maritime Strategy*, (Annapolis, MD: Naval Institute Press, 1988), 93.

important national commercial interests related directly to the economic, and in the cases of space in particular, informational wellbeing of the state during periods of both peace and war. Therefore, unlike armies and air forces, space forces, like naval forces are required to defend our interests even in times of peace.

The Navy's Sea Power 21 plan has a number of areas of emphasis for the future that might be met with space capabilities rather than naval force structure developments. The Navy defines its sea strike concept as providing "true time-sensitive strike – i.e. sensor-to-shooter closure ... measured in seconds."¹⁷ Under their future strike concept "speed becomes the dominant principal of war."¹⁸ Space systems can provide short sensor-to-shooter timelines and once launched can respond with direct attack munitions on shorter timelines that naval forces can transit from home ports to areas of operation. Other sea strike operations such as "offensive computer network operations and precise electronic strike, covert nonkinetic actions will help control crisis escalation and shape the battlefield prior to initiation of hostilities."¹⁹ These missions would appear ideal for space-based jamming and electronic interference systems should they be developed and fielded. It would seem that "computer network surveillance and attack – from the sea"²⁰ could easily be modified and perhaps may be better stated as from space, given the inherent, though potential, omnipresence of space-based systems. Finally, the Navy's sea strike concept discusses unmanned air, surface, and undersea vehicles as providing "long surveillance dwell times and

¹⁷ Cutler Dawson and John Nathman, "Sea Strike: Projecting Persistent, Responsive, and Precise Power," *Proceedings*, (Annapolis, MD: Naval Institute Press, December 2002), 54.

¹⁸ *Ibid*, 54.

¹⁹ *Ibid*, 55.

²⁰ *Ibid*, 55.

expanded warfare options while minimizing risks to the war fighter.”²¹ Space based weapons and surveillance systems would offer similar advantages.

In addition, according to Navy doctrine, “operating in forward regions of the world enables us to maintain situational awareness that is critical to gaining the upper hand during a conflict’s early stages.”²² Current space capabilities offer this situational awareness today. In the future, the presence of space-based weapons could provide what the Navy says it offers, “the commander-in-Chief [with] the enabling force he needs to respond decisively without the limitations of lengthy transit times.”²³

Though access to space can be limited by an adversary with appropriate countermeasures, so too can access to the sea be limited or prevented. The limiting factor for navies that is not shared by space forces is that, at least under current operational parameter, space systems are unmanned while naval systems present the potential for significant loss of life in addition to the cost of the hardware should they be effectively attacked. Therefore I agree with the Navy’s position:

The ultimate source of peacetime persuasive power lies in the implied guarantee that both the intent and capability to protect our national interests are present just over the horizon, with the fortitude and staying power to sustain operations as long as necessary.²⁴

However, I might argue that the better guarantor of our nation’s “intent and capability to protect” may be space rather than naval forces.

While the Navy may be unintentionally arguing in favor of capabilities that may be better met through space systems, the Air Forces’ efforts to justify its stewardship of space

²¹ Ibid, 55.

²² United States Navy, *Naval Doctrine Publication 1: Naval Warfare*, (Washington, D.C.: Department of the Navy, March 1994), 9.

²³ Ibid, 9.

²⁴ Ibid, iii.

may similarly be using the wrong argument. The founding document for Air Force space stewardship was the 1988 Blue Ribbon Panel which called for the fostering of a “broader institutional view of how military power is applied above the surface of the earth.”²⁵ This exploitation of the vertical dimension has been the major thrust of the Air Forces’ efforts to integrate space into aerospace and/or air and space capabilities. However, the integration concept tends to neglect that key differences exist between air and space operations. Failure to recognize these key differences, limits the innovative thinking about how space power, standing separate from airpower, can contribute to the joint fight.

Also, while similarities between space operations and naval operations may argue in favor of naval control of space missions, they may also support arguments for the reduction of naval assets in lieu of greater funding for space weaponization. If space weapons can impose our national policies on an adversary without the corresponding risk to American lives, perhaps policy makers will consider them a more viable alternative to naval capabilities. In fact, as discussed earlier, the Navy’s proposed future capabilities may present the Air Force or some other space advocate with fodder to justify the development of space weapons. The Navy might want to be careful what it asks for or at least how it describes the attributes of the systems it needs.

Since space systems or at least the defense of commercial space interests is a requirement in both peacetime and wartime, dual purpose space-based weapons (weapons that can attack both space-based and terrestrial targets) could be considered for a possible role in deterrence. These systems could provide U.S. decision makers and combatant commanders with power projection options during periods of peace and war. Since the potential for multi-

²⁵ David N. Spires, *Beyond Horizons: A Half Century of Air Force Space Leadership*, (Maxwell AFB, Alabama: Air University Press, 1998), 236.

mission, universally present power projection is at least possible with space-based weapons, one could ask why such innovations have not been pursued. The answer might be found in the nature of military innovation and change itself.

Military Innovation

If my assertion that space weapons are a disruptive technology is true the natural follow-on question is how the military can introduce innovations that overcome the drive to avoid change. According to Williamson Murray's article in *Military Innovation in the Interwar Period*, "it is the interplay between past experience, individual leaders and innovators, and the cultural climate within the military organizations that determines how successfully innovation proceeds."²⁶ The American military experience and cultural climate has a mixed record of innovation acceptance. With the end of the cold war, the military services are all in a relative state of flux in a climate of ill-defined "transformation." However, transformation implies change and defense policy seems amenable to experimentation with new warfighting methods. Given an environment of relative acceptance or at least neutrality toward new ways of war, it would seem that the third element above, the role of individual leaders and innovators would be the determining factor on how the military transforms. "Individuals can, and often do, exercise great influence over the [innovation] process."²⁷

The process of innovation is complex. How and why innovation might occur is not easy to assess or predict. In the case of space weaponization, we are talking about a major leap in policy and a relatively new way of fighting. Unmanned, perhaps autonomous weapons with a potential peacetime presence will present policy makers with options that

²⁶ Williamson Murray and Allan R. Millett, ed., *Military Innovation in the Interwar Period*, (Cambridge, UK: Cambridge University Press, 1996), 18.

²⁷ *Ibid*, 49.

they do not currently have the potential to conduct near real-time action with corresponding near real-time consequences.

Again according to Williamson Murray, revolutionary innovations of the type space weaponization represents “appear largely as a phenomenon of top-down leadership – leadership that is well-informed about the technical as well as conceptual aspects of the possible innovation.”²⁸ This idea indicates to me that neither the science and technology nor the policy communities alone are capable of making this assessment. They would not be the proper advocate. Further it would seem to me that a well-informed combatant commander, with experience in the type of high technology warfare the United States has been engaged in over the past decade, would be well-suited to advocate for and properly influence future weapons innovations.

Conclusion: Why should combatant commander Advocate Space Weaponization?

Combatant commanders are responsible for promoting peace and winning wars within their areas or geographic or functional responsibility. With the dismantling of United States Space Command, there is no longer a combatant commander whose primary focus is space. As such, the job of defining future space missions and capabilities falls primarily upon Strategic Command, but is also now shared among all geographic combatant commanders. What these commanders must do is assess how space capabilities with their inherent presence and potential deterrent qualities might support their portion of the joint fight.

²⁸ Ibid, 306.

The Air Force's theory of war is that exploiting the vertical dimension has inherently strategic impacts on warfighting.²⁹ Space as the ultimate high ground fits within this strategic construct. The Navy with its sea strike concept has highlighted a number of capabilities need in the future that lend themselves to accomplishment through space-based assets. Unfortunately service advocacy alone can and often is rightfully perceived as self-promotion: rhetoric designed to enhance their relative budget position. While service advocacy is important, it cannot stand alone. Neither are technologist or policy think tanks the right advocacy group. Technologist can define the realm of the possible, but they are not well-suited to relate the possibilities or warfighting tasks. "A strategy for choosing new military technologies ... has to take account of an environment in which it is extremely difficult to make any conclusive analysis of the prospective cost and utility of alternative research and development programs."³⁰ Policy think tanks try to meld the technology with warfighting concepts and international law and/or national policies. Their arguments present useful fodder for intellectual debate, but they can ignore the essence of warfighting: winning the next war on terms favorable to the United States and within acceptable costs in terms of dollars, lives and timelines.

Even though U.S. treaty obligations no longer prevent the pursuit of space weaponization, the policy community seems committed to reducing the appeal of space-based weapons. Bruce DeBlois, formerly a senior fellow for science and technology at the Council for Foreign Relations, presented a well-conceived argument against space weaponization. Unfortunately, his position is based on an assessment of a list of currently proposed space weapon alternatives. These alternatives represent weapons looking for a

²⁹ Phillip S. Meilinger, *10 Propositions Regarding Air Power*, (Maxwell AFB, AL: Air Force History and Museums Program, 1995), 8-13.

³⁰ Rosen, 51.

mission rather than combatant commander mission requirements looking for a weapon. As a result the weapons fall short, and Dr DeBlois' position is supported. The most bothersome parts of his argument for me were his assertions that we can already win terrestrial conflicts without space weapons and that even though space weapons have the ability to reduce response timelines, the limited ability of man to rationalize a complex international situation will preclude our ability to employ a weapon with these inherent advantages.³¹ The problem with this argument is that it emphasized the status quo. The United States is a world superpower because it maintains a qualitative edge over potential adversaries. I have the sense that if Dr. DeBlois was alive a century ago, he would have argued against military aircraft development because we already had balloons for observation and artillery and battleship firepower had sufficient range to meet our military needs on land and sea.

It is from within this "noisy" environment, that combatant commanders must present a voice of reason and directness. They must wade through service-level parochialism, technologist peddling their wares, and policy wonks espousing the status quo for the benefit of mankind. Combatant Commanders are the best hope for space weaponization should they believe that such capabilities will enhance their mission accomplishment.

Recommendations

1. combatant commanders take a position on space weaponization ... articulate requirements for future capabilities not positions on the current list of available weapons. In this way the technology community can focus on technology developments that directly relate to warfighting requirements rather than on peddling their current list wares.

³¹ DeBlois, 69.

2. combatant commanders can play and the Joint Requirements Oversight Council can evaluate the trade space between existing capabilities potential space weapons that might replace them. Space systems are costly, but manned terrestrial systems have inherent cost not only in the systems themselves but also in human capital.
3. The Science and Technology community should focus on overcoming space vulnerabilities through technology development programs that test innovative operations that ameliorate space system vulnerabilities. A lucrative research and development area may be found in technologies that disguise the signatures and missions of space systems.
4. Political and Systems analysis should not argue for or against space-based capabilities based on what is currently possible. If they truly believe space has nothing to offer the warfighter, they need to tell the warfighter and let the warfighter debate the issue. If space weaponization has nothing to offer, then the combatant commander is the one to convince.
5. Overall, the United States should not limit itself in terms of weapons development for fear of being the first to develop a capability. Space is a place not a mission. If we can exploit it to our economic advantage, we should not be afraid to exploit for its military advantages, if any, as well.

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